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Original article

Physioclinical Assessment of minute ventilation, maximum voluntary ventilation,anddyspneic index in chronic alcoholics

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Abstract:

Introduction: Alcohol is the active ingredient of many social beverages such as wines, beers, whiskies brandies & country liquor. Since it is classified as inebriant poison, & intoxicating drink poor nutrition and frequent episodes of aspiration pneumonitis is common in chronic alcoholics.

Material& Methods : The study was conducted on 120 male subjects belonging to age group 20 – 60 years out of which 60 were control & 60 were chronic alcoholics.MVV and dyspneic index was studied using simple spirometer and computerized medspiror, Recorders & Medicare systems Chandigarh, in above subject which shows significant decrease in MVV & DI in chronic alcoholics as compare to control.

Results: MVV & DI were significantly decrease ($P<0.05$) in chronic alcoholics as compare to control in all age groups 21-30, 31-40, 41-50, 51-60.

Conclusion: In conclusion there is significant decrease in MVV & DI which may be due to poor nutrition n, diffusion limitation & airway resistance affecting primarily ventilatory functions of lung leading to airway resistance along with dyspnea.

Key words: maximum voluntary ventilation, dyspneic index, chronic alcoholics

Introduction

The lungs perhaps fundamentally be altered by alcohol and the existence of alcoholic lung disease was suggested by the pioneering works of Burch and De-pasquale in 1967(2)Alcohol being classified as inebriant poison, the word alcohol means any intoxicating drink, the common ones are ethyl and methyl alcohol which is transparent, colorless, volatile liquid having an aromatic odor and burning tests. It is the active ingredient of many social beverages such as wines beers, Whiskies brandies & country liquor.Poor nutrition and frequent episodes of aspiration pneumonitis is common in chronic alcoholics which may leads to airway disease.(3,4)

Aims & Objectives

1) To find out maximum voluntary ventilationand minute ventilation in chronic alcoholics
2) To study the degree of dyspneic index with the help of maximum voluntary ventilation and minute ventilation in chronic alcoholics.
3) To know the grade of dyspneic index & degree of airway obstruction in chronic alcoholics.

Material & Methods

The cross sectional study was conducted in the department of Medicine and Department of Physiology at SRTR Medical College, Ambajogai.

Total 120 subjects belonging to age group 20 to 60 years of that, 60 were chronic alcoholics and 60 were normal apparently healthy subject who served as age matched controls were taken. The study group further divided age wise into 21-30, 31-40, 41-50 & 51-60 .

Institutional ethical clearance was obtained purpose of the study was explained to the subjects who had volunteered for the study. An informed consent was obtained. A through physical & systemic examination of RS, Abdomen, CVS, CNS of each subject was done, best of three readings were taken.

Inclusion criteria: Apparently healthy subjects were included in the study. The apparent health status of the subject was determined by history taking and through clinical examination.

Exclusion Criteria: Subjects with acute respiratory tract infection like pneumonia, chronic Bronchitis, emphysema, Asthma, Liver abscess and liver cirrhosis were excluded from, study.

The following parameters were recorded in each subject.

A) Physical Anthropometric parameter: Standing height (in Cm) Weight (In Kg) Age in years, sex, Room Temp.

B) Respiratory parameters: The subjects were informed about the procedure for each test three readings were taken. The height the three was considered for calculation. All the tests were recorded in a sitting posture at room temperature, in morning hours.

The following parameters was recorded by computerized medspiror (Recorders & Medicare System, Chandigarh).

MVV: It is the largest volume of air that can be mood in & out the lungs in one minute by maximum voluntary efforts normal 120-170/m(5)

In this the subject was asked to respire as rapid as and as deep as possible for six seconds into the mouthpiece.

TV: The amount of air that moves into the lung with each inspiration or expiration, normal value 400-500 ml It was recorded by simple spirometer (6)

RR: Respiratory rate cycle/min was recorded.

RMV: This the volume of air expired or inspired by the lung in 1 min normal value 6 Lit/min(7)

Dyspneic Index (DI) refers to breathing reserve % of MVV Breathing reserve is the different between MVV & RMV normal 70-95% and DI <60% is dyspnea.(8)

We have considered only pre (observed) values and volume/time plot.

Statistical Analysis: Statistical analysis was done using SPSS. The result are expressed as mean +- SD. Comparisons between be study group (21-30, 31-40, 41-50, 51-60)and control groups were carried out by t' test P value < 0.05 was considered as statistically significant.

Observation and results

Table I: Observed values of MVV in litres/sec. in control and chronic alcoholic patients (ALC)

Parameter:MVV in litres/sec.								
Age group	21-30		31-40		41-50		51-60	
	Control n=13	ALC n=10	Control n=18	ALC n=19	Control n=15	ALC n=16	Control n=14	ALC n=15
Mean	78.45	53.82	80.48	51.74	82.71	53.96	81.76	48.27
SD	6.49	11.22	10.29	9.64	9.50	10.94	9.76	11.51
t-test	P<0.05		P<0.05		P<0.05		P<0.05	

The MVV values were decreased and found to be significant statistically In all age groups when compared with control group.

TableII: Observed values of dyspneic index (% of Breathing reserve) in control and chronic alcoholic patients and found to be significant statistically when compared with control group.

Dyspneic index	Total no.of subject	Mean	SD	Std..error mean
Control	60	75.30	14.40	1.85
Alcoholics	60	52.25	6.50	0.84
t-test		P<0.05	P<0.05	P<0.05

Discussion:

A low dyspneic index (% of Breathing reserve) is a characteristic of primary lung disease.in early obstructive lung disease flow volume loops can demonstrate expiratory flow limitation it suggests a ventilator limitations the present study matches with Arthur S Banner who stated that mild obstruction evidence of restriction and diffusion limitations are the characteristic of chronic alcoholism.

Clinicians have long been aware of an association between alcohol abuse and lung disease (9,10) with better understanding of ethanol-induced biochemical abnormalities and the biologic concomitants of alcoholism the adverse effects of alcohol upon lung have become more firmly established.(11)

There is evidence now that alcohol impairs the protective mechanism of the airways and ventilator functions of the lungs primarily by causing airway obstruction.

The pulmonary mechanics suggests (12) Physical alveolo-capillary block rather than loss of diffusing membrane or decrease in capillary blood volume in chronic alcoholism. Further there is degranulation of mast cells which releases histamine and induces asthma. According to Scanlan, Respiratory disease which restricts or blocks airflow, in that subject breathing reserve typically falls below 30% of MVV. In these cases B.R. can be reduced to such an extent that maximum minute ventilation equals to or exceeds MVV according to PF ting by Jack Wanger.

MVV is a measure of the maximum amount of air that can be inhaled and exhaled within one minute, it is also a measure of respiratory muscle performance. Impaired pulmonary functions are associated with red mortality and morbidity (13) De Pasquale in 1967 put forward a hypothesis as regards to alcoholic lung disease. In alcoholics the furthers like poor nutrition, frequent infection of the respiratory tracts contribute significantly to high incidence of chronic lung disease in alcoholics within airway resistance. (14)

Conclusion:

In conclusion the current study has shown that there is significant decrease in MVV and DI (% of BR) which may be due to diffusion limitations airway resistance affecting ventilatory functions of lung which may lead to large airway disease & dyspnea in chronic alcoholic Paucity of work in this regard our study can from the basis prompting further detailed studies in this regard.

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